CHAPTER – I

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1.1 INTRODUCTION:

Radhanagari Wildlife Sanctuary is situated in greenly ranges of Sahaydri of Western Ghat in Kolhapur District. Western Ghat which is well acquainted as a one of the most vulnerable and delicate hot spots of the biodiversities in the world. Previously jungle of Radhanagri was specially used as favorite hunting spot by the king of Kolhapur Chhatrapati Shahu Maharaj. In the year 1958 this game reserve including places from south and west including Panlet, Olvan, Gaganbawada and Mouje Taliye making altogether 19.61 Sq. Km of an area was declared as Sanctuary for bison and recognized as Dajipur Bison Sanctuary (Reserve Forest). After that by taking into account the importance of diversified forests and occurance of distinguished wild animals, the Government of Maharashtra and the Revenue Department of forest tried to develop and secure these places by law. Therefore by the Government rule no. WLP 1085 CR/581/V.F.5/ dated 16/09/1985 the jungles of the catchments zone of 'Laxmi Lake' Radhanagari and 'Rajarshi Shahu Sagar' Kalammawadi dam declared as Radhanagri Wild life Sanctuary . Now this Radhanagari Wildlife Sanctuary is famous exclusively for Gaur the Bison and other wild animals. In India it is well recognized.

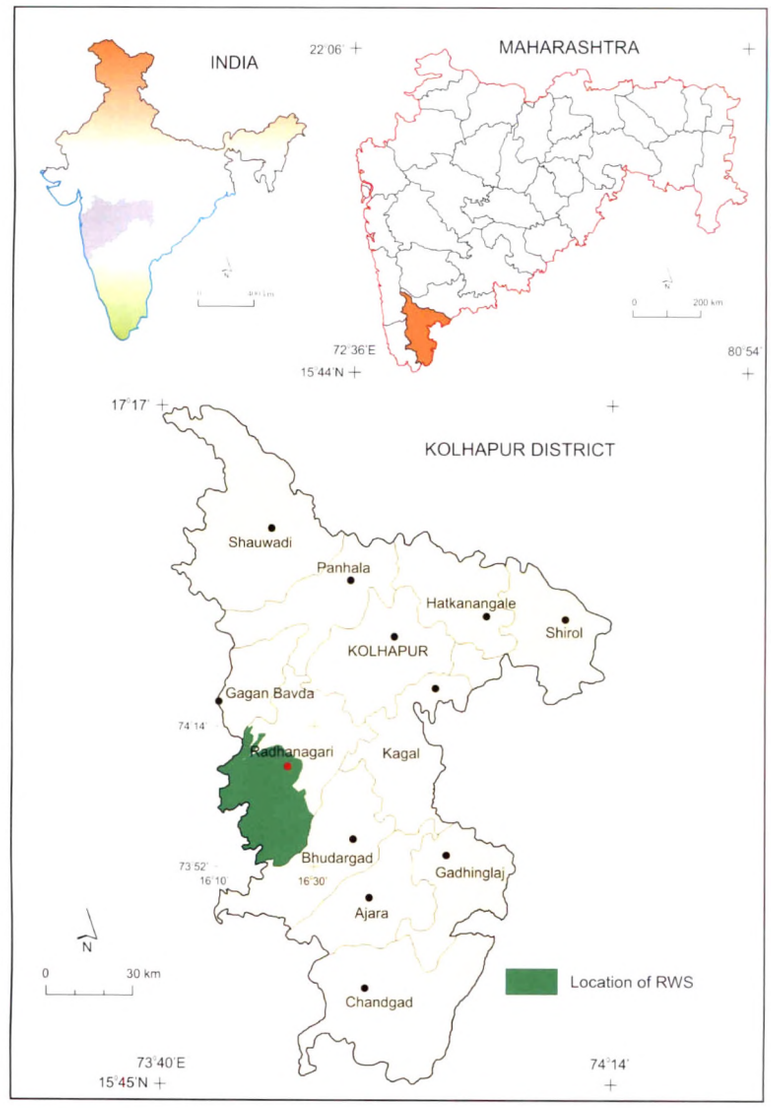
As a result of expansion of Radhanagri Wildlife Sanctuary, even wild animals in Karnataka State are frequently migrating to the Radhanagri Sanctuary. Especially wild Tuskers and Bison are frequently migrating in the forest of Radhanagri. According to 2004 wild life census, there was considerable population of Bison

from 395 to 610. The study of Radhanagri Wildlife Sanctuary in that respect is very important. The versatile Geographical Environment of Radhanagri Wildlife Sanctuary which includes surface structure, soil, climate, plant and animal diversity which has tremendous scope to look into. In addition the study of Natural Resources i.e. Water, minerals, Flora and Fauna is also having a large scope. In global and national respect management and planning of wild life, plants, soil and forest with its conservation for the development of Radhanagri Sanctuary is very important.

1.2 LOCATION AND EXTENSION OF THE STUDY AREA:

The present investigation is restricted to Radhanagri Wildlife Sanctuary which occupies southern and western parts of Radhanagri and Gaganbawada Tahsil in Kolhapur District. The Kolhapur district is one of the 35 districts of Maharashtra and situated in the greenly ranges of Sahyadri in the southern part of Maharashtra. Radhanagri Wildlife Sanctuary is 95 km from Kolhapur.

Radhanagri Sanctuary is well known among the 35 Sanctuaries in Maharashtra. This is also recognized as Dajipur Reserve Forest. Radhanagri Sanctuary has a slight dumbbell shape and extended in the Bhogavati and Dudhganga basin. It has east – west stretch of about 23 km and north – south is about 31 km. There are two ranges namely Radhanagri (WL) and Dajipur (WL) covering 18336.41 hectare and 9898.29 hectare respectively. Altogether it covers 28234.70 hectare which is 351.16 Sq. Km. according to the area occupied by the forest it is 23147.50 hectare by Reserve Forest, 4728.59 hectare area is occupied by Protected



Map 1 : Location Map of Radhanagari Wildlife Sanctuary (RWS)

Forest whereas 358.61 hectare area is occupied by Unclassed Forest.

In respect to the forestry there are two ranges (each range occupy 250 sq. km of an area), six rounds (each round occupy 30-40 sq. km of an area), 17 beats (each beat occupy 10 sq. km of an area), 46 compartments (basic management unit) with 33 villages. The study area is bounded on the North by boundaries of villages Taliye Bk., Borbet, Manbet and Padsali, on The West by Sindhudurga and on the South by Bhudargad Tahsil and on the East by boundaries of villages Durgmanwad, Piral, Farale, Rajapur and Aini. The total length of boundary is 495.63 Km. incorporating 208.63 km external boundary and 287 km internal boundary.

The area under study lies between 16^0 10' to 16^0 30' North Latitudes and 73^0 52' to 74^0 14' East Longitude, located in the catchments area of Bhogavati and Dudhganga basin. Annual rainfall is about 2500 mm to 5000 mm. Height from the mean sea level is in-between 550 m to 1000 m. (Map: 1)

1.3 SELECTION OF TOPIC:

The selection of the topic is based on the following considerations:

1) Radhanagri Wildlife Sanctuary is situated in greenly ranges of Sahyadri of Western Ghat which is famous for Bison and other wild animals.
2) The Radhanagri Wildlife Sanctuary is situated in the ranges of Western Ghat which has global and national significance in respect of vulnerable and delicate ecology and biodiversity.
3) In the study region, there is an impact of physiography on Flora and Fauna.

4) Radhanagri Wildlife Sanctuary is one of the renowned and most famous and rapidly developing tourist centers in western Maharashtra.

5) The most important species of vegetation and wild animals, which are distinguished for the ecological balance occur in this reserve forest. Most of these plant species are endangered or on the verge of extinct.

6) For the preservation of the forest some master plan is needed.

7) The study of Radhanagri Wildlife Sanctuary has not yet been done in the view of biodiversity by any geographer.

All these above considerations have motivated to do a geo-environmental study of Radhanagri wildlife Sanctuary with respect to biodiversity.

1.4 OBJECTIVES OF THE RESEARCH:

The main objective of the present study is to recognize biodiversity of the area by identifying and demarcating the flora and fauna with their environmental set-up including physiography, soil, drainage pattern, climate, diversified species of plants and animals and its management and planning related to conservation.

In view of the above following specific objectives are mainly focused in ongoing study.

1) To obtain the basic information of Radhanagri Wildlife Sanctuary from Remotely Sensed images, Google Earth images, Toposheets, Supplemented with field work on different aspects such as Geology, Geomorphology, soil, climate, Bio-Diversity with its Management and Planning.

2) To study the floral diversity (Plants, Herbs, Shrubs, Trees and Climbers etc.) by direct observation and from Kolhapur district flora.

3) To look into the faunal diversity (Wildlife: Animals, Birds, Reptiles etc.) by observations and records.

4) To find the scope of management and planning which is related to soil, forest, and wildlife conservation.

5) To explore and identify the problems resulting from the natural and human interaction with the environment of Radhanagri Wildlife Sanctuary.

1.5 METHODOLOGY, DATABASE AND SOURCES:

In this study, the biodiversity in respect of plants and animal is considered. Therefore this study is based on exhaustive field survey in this respect the study is conducted as described bellow:

1) Preliminary Investigation: In Preliminary Investigation, an available literature is consulted. Pre-field stage commenced with the collection of required map of Radhanagri Wildlife Sanctuary and related information, toposheets, aerial photographs etc.

2) Field Work: Preliminary Investigation is followed by Field Work with an objective to check interpreted details and to incorporate additional information as encountered and suggested in preliminary work. However identification and observation of floral and faunal species had unavoidable significance.

A field study has been planned with the help of aerial photographs, maps, Google Earth images and records. The observation of plants and animals has been conducted during field work with the use of GPS device.

3) Analysis of the Data Collected in the Field: The collected data has been processed and analyzed, different quantitative and statistical data are applied for interpretation and to draw inferences. The results are presented through different cartographic presentation like graph, charts and maps.

The actual field survey of the area is done in several stages. There are preparatory works including collection and reproduction of data and statistical methods, field work, observation of Geo-Environmental set-up, plants and animal's diversity working out of the proper maps and writing of final reports.

Database and Sources:

The proposed work is based on primary as well as secondary data.

1) Primary Sources of Data: The primary data has been collected through field work, observation, discussion during field work.

2) Secondary Sources of Data: The secondary data is collected from published records of the Government like Conservator (Wildlife) Division, Kolhapur, Assistant Conservator (Wildlife) Radhanagri Sanctuary, Radhanagri, Ranger (Wildlife) Dajipur, Ranger (Wildlife) Radhanagri.

It also includes published and unpublished reports and abstracts, journals, books, soil reports and available literature on sanctuaries and forest news bulletin etc.

Socio-Economic Review of Kolhapur District, Statistical abstracts, Census of India, District hand book, Gazetteer of Maharashtra State, Kolhapur district Gazetteer, data regarding weather parameters (Rainfall, Humidity and Temperature) collected from India Meteorological Department (IMD) regional station Kolhapur, Geological and soil data will be collected from the records of the Geological Survey of India (GSI) Department of

Geology and mines, Government of Maharashtra State, the Agricultural Department, Groundwater Survey and Development Agency (GSDA) Government of Maharashtra, Remote sensing imageries, Google Earth imageries, Toposheets are the chief tools used for further study.

In the above context and keeping in a view understanding the physiographical characteristics, the Remote Sensing imageries have also been used in conjunction with Geomorphic and Environmental factors obtained from field survey to analyze, detect, by mapping of existing status of plants and animals.

1.6 SIGNIFICANCE OF THE RESEARCH WORK:

Near about 200 sanctuaries, National Parks and other miscellaneous natural areas have been established in the country to provide protection to wildlife of different categories and to conserve diversified plant species. Sanctuaries having natural habitat provide maximum protection and optimum living conditions to the plants and animals including avifauna (birds) and reptiles. No killing or possession of wild animals is allowed in the sanctuaries except the written permission by the concern authority.

The wildlife action plan was started at national level in 1983 in India with the basic objective to chalk out and due implementation of strategies, programs and projects for the conservation of existing and future wildlife in the protected areas which is increased from the existing 3 to 4% of geographical areas of the country.

Radhanagri Wildlife Sanctuary is one of the important wildlife sanctuaries in India which established in 1985 by the Government of Maharashtra with moderate area under reserve

forest i.e. 351.16 Sq. km exclusively for bison. Owing to the location in western ghat this sanctuary has national and global importance in respect to the biological diversity. Therefore there is a wide scope of study the region through conservation and protection point of view.

The data drawn during fieldwork is correlated and verified with existing Biodiversity studies of plants and animals which also give a concrete idea about the integrity between physiography and environmental conditions and biodiversity on the basis of which management and conservation of plants and animals can be checked out. In the context of biodiversity it is very important to conserve such delicate and vulnerable ecosystems to maintain the balance of the biosphere.

1.7 OUTLINE OF THE RESEARCH WORK:

Entire work has been systematically and very meticulously organized in to five consecutive chapters including conclusion and recommendations.

The first chapter consists of statement of study area, selection of topic, objectives of the research, methodology, database and sources, significance of research work and brief review of Literature. The second chapter is concerned with geo-environmental setup which incorporates geology, physiography, drainage system, climate, soil and availability of resources. The third chapter is related to biodiversity and existing status of plants and animals with value of flora and fauna at different levels. Problems and conservation of the biodiversity has also been discussed appropriately. An impact of physiography on flora and fauna has also been recognized. The fourth chapter deals with the

management and planning includes conservation of plants and animals. Where as, the final chapter is of conclusions and viable recommendations, suggested for the development of study area.

1.8 REVIEW OF LITERATURE:

On the research front it is found that several attempts have been made by environmentalist, botanist, zoologist and some scientists as well as geographers and scholars from other disciplines to study the different aspects of various important wildlife Sanctuaries and National Parks in India and abroad. Regarding the study of Radhanagri Wildlife Sanctuary is also likewise, it is mostly done by botanists with the botanical views, therefore it is recognized that there is need of all attention to do geo-environmental studies and its impact on flora and fauna in the sanctuary. However from the view of biodiversity there is ample scope for study.

Some scholars who studied wildlife sanctuaries (Reserve Forests) and National Parks have referred and reviewed accordingly.

1) Choudhary A.K., Sharma P.K , Chandel S.(2005): Study on Medicinal and A romatics Plants Biodiversity of Himachal Pradesh Himalayas, Tigerpaper, Vol.32:No.4 Oct-Dec 2005, pp.6-10-

In this paper the authors have discussed about the medicinal and aromatics plants biodiversity , its present status and need of conservation.

2) Eilu Gerald and Obua Joseph (2005) : Tree Condition and Natural Regeneration in Disturbed Sites of Bwindi Impenetrable Forest National Park, Southwestern Uganda. Tropical Ecology (Vol. 46, No. 1, 2005). Pp. 99-111 –

Gerald Eilu and Joseph Obua has clarified and explained tree condition and natural regeneration in disturbed sites of Bwindi Impenetrable Forest National Park, Southwestern Uganda. Therefore, high intensity human disturbances were associated with fewer signs of mammal damage. Damage to trees by physical agents and climber abundance increased with intensity of disturbances except in completely disturbed forest.

3) Guha Sumit, (1999): Environment and Ethnicity in India, Cambridge Studies in Indian History and Society, Cambridge University Press-

This book draws attention on a wide range of history of forest communities in India and explore environment in an ancient agrarian society. He has threw a light on continually modified environment under the influence of man.

4) Kadavul K. , A. Pragasam, A. K. Dixit, R. Diane Joseph & J. Prasena. (2006) : Biodiversity of Host Species of Mistletoes of Pondichery, Coromandel Coast of India. Nature Environment & Pollution Technology. (Vol. 5, No. 2, June 2006). Pp. 309-313 –

K. Kadavul, A. Pragasam, A. K. Dixit, R. Diane Joseph & J. Prasena has clarified and explained Biodiversity of Host Species of Mistletoes of Pondichery, Coromandel Coast of India. The plant parasites namely, *Dendrophthoe falcata, Viscum orientale, Cuscuta reflexa* and *Cassytha filiformis* were found to be colonizing certain plant species of Pondechery vegetation of the coromandel coast, South India and its nearby areas. Totally 49 hosts of the above parasites were noted. The parasite *D. falcate* was observed on 37 varied hosts, *viscum orientale* on 2 hosts, and *cuscuta* and *cassytha* on other hosts. The texonomy, economic damage and control measures of the parasites have been briefly discussed in this paper.

5) Kadir Yilmaz, Selcuk Inac, Huseyin Dikici and Ayse can Reyhanli (2004) : The Effects of a Coal Power Plants on the Environment and Wildlife in South Eastern Turkey. Journal of Environmental Biology (Vol. 25, No. 4, October 2004). Plan Period – 2001 – 2002 to 2010 – 2011 –

This management plan is prepared with a view to conserve the bio-diversity for posterity and development of the protected area and to create nature conservation awareness among the people on scientific lines based on the National Forest Policy and National Wildlife Action Plan.

6) Moza M.K., Bhatnagar A.K. (2007): Plant Reproductive Biology Studies Crucial for Conservation, Current Science, Vol.92, No. 9, 10 May 2007, pp.1207-

For biodiversity conservation, reclamation and restoration, study of reproductive biology can provide important paradigms. Such studies would p prove to be fruitful in planning various programs specific to different habitat.

7) Perara G.A.D. (2005) : Diversity and Dynamics of the Soil Seed Bank in Tropical Semi – Deciduous Forest of Sri – Lanka. Tropical Ecology (Vol. 46, No. 1, 2005). Pp. 65-78 –

G.A.D. Perara has clarified and explains diversity and dynamics of the soil seed bank in tropical semi-deciduous forests of Shri Lanka. The nature and the magnitude of the soil bank of tropical semi-deciduous forests at Sigiriya. Sri Lanka were examined in 41 experimental plots established along a chronosequence of forest age to reveal the potential role of the soil seed banks in forest regeneration and succession following a large-scale disturbance. Species composition and abundance in the soil seed banks were influenced by the time of the year and the

structure of forest where the latter is highly determined by the age of forests after a large-scale disturbance. Clumping of seeds in the soil seed bank was commonly seen in all studied forests. Soil seed banks of young successional forests were dominated by agricultural weeds, and their seeds were mainly dispersed by wind. Therefore, such seed bank increased and the seed banks do not often contribute to the forest regeneration. After about 20 years, the diversity of the soil seed bank increased and the seed banks contained some forest tree and shrub seeds. Since the microclimate of such forests are more favorable for seed germination and seedling establishment, seeds which reach these forest might germinate and establish well, contributing to successful forest regeneration and succession. Seed bank of mature forest contain less number of seeds but are also dominated with grass and agricultural weed species. Therefore, these seed banks can not support the natural regeneration of tropical semi-deciduous forest after a large-scale disturbance. Instead, speed of grass and agricultural weed species would germinate and establish if a disturbance occurs. Therefore, such forests are under a threat of degeneration with frequent disturbances.

8) Rawat M.S.S. (2004): Social and Cultural Role of Trees and Forests in the Garhwal Himalayas. National Geographer (Vol. 39, No. 112, December-January, June-July 2004). Pp. 97-107 –

M.S.S. Rawat has clarified and explained social and cultural role of trees and forests in the Garhwal Himalayas. In the Garhwal Himalayas forest constitute a dominant feature of the natural landscape of the region. Besides fulfilling the basic needs (food, fodder, fuel, shelter and clothing) of the people forests provide base for the economy and play a crucial role in the socio-cultural life of

the Garhwali community. Forests and trees find their impressions in myths, rituals, performative arts, feasts, festivals, songs, dances, house design, custom and clothing of the people. So much so that the entire culture of Garhwal may be termed as 'Van Sanskriti' (forest culture) because of the deep attachment of the people towards forest. It is this concern which has given birth to the 'Chipko Movement' to save the forest from unscrupulous human greed's and growing development activities.

9) Srivastava Sudha (2003): Forest and their Spatial Relations – A Case Study of Raigad District. (Maharashtra). The Deccan Geographer (Vol. 41, No. 2, December 2003). Pp. 29-39 –

Sudha Srivastava has clarified and explained forests and their spatial relations with a case study of Raigad District. Tropical forest form and important resource base for both subsistance and commercial purposes. They are also components of the Carban and water cycle with science and technology progressing by leaps and bounds especially the transport sector, rapid strides have been made in development of region, which were hicher tucked away in the far interior accessibility brought in its wake possibilities of exploitation of resources of such region. A long history of accupancy by man instilled tradition that took care of the resources without their degradation but with the colonial rule and its imposition came a change in attitude locals got alienated and their interest in conservation waned with the simultaneously growth and spread of Mumbai Forest were further depilated. This gave rise to changes in their form and composition. The present paper seeks to identify distributional pattern and relations of forest of Raigad to slope and coverage and how measures should be taken to improve the situation.

10)Yadav S. R. and Sardesai M. M. (April 2002): Flora of the Kolhapur District, Shivaji University, Kolhapur.

In this flora Prof. Yadav and Sardesai has accounted complete listing of floral plants occurred in Kolhapur district. The classification of flora has given according to Benthun and Hooker's system in which family wise listing of the plants has been given. About 2360 species are identified and reported, generally wild plants, medicinal plants, cultivated plants, cropping plants, ornamental plants has been identified.

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